

What is claimed is:

5 1. A drive wheel bearing assembly having a fixed type constant velocity universal joint, coupled to a wheel bearing, mounted to one end portion of an intermediate shaft, and a sliding type constant velocity universal joint, coupled to a differential, mounted to the other end portion of said intermediate shaft,

10 wherein one end portion of a stub shaft is connected to an inner joint ring of said fixed type constant velocity universal joint via torque transmission portions;

one end portion of said intermediate shaft is connected to the other end portion of the stub shaft via torque transmission portions;

15 a threaded portion is formed on an outer diameter portion of either the intermediate shaft or the stub shaft;

a nut member threadedly engages the threaded portion; and

20 a keeper ring is fitted into annular grooves formed on the other outer diameter portion of said intermediate shaft or said stub shaft and an inner diameter portion of said nut member to allow said nut member not to move axially but to be rotatable.

25 2. A drive wheel bearing assembly according to claim

1, wherein the inner joint ring of said fixed type constant velocity universal joint is tightly fitted over the stub shaft, and said stub shaft is tightly fitted over the intermediate shaft.

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3. A drive wheel bearing assembly according to claim 1 or 2, wherein a maximum outer diameter of said fixed type constant velocity universal joint is smaller than an outer diameter of the wheel bearing.

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4. A drive wheel bearing assembly according to claims 1, <sup>or 2</sup> ~~to 3~~, wherein of said stub shaft and the intermediate shaft, at least the stub shaft is made hollow.

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5. A drive wheel bearing assembly having a fixed type constant velocity universal joint, coupled to a wheel bearing, mounted to one end portion of an intermediate shaft, and a sliding type constant velocity universal joint, coupled to a differential, mounted to the other end portion of said intermediate shaft, said drive wheel bearing assembly comprising a stub shaft connected to an inner joint ring of the fixed type constant velocity universal joint by means of torque transmission portions and an engagement portion, formed on an outer diameter portion of one end thereof, and connected detachably to the

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intermediate shaft by means of torque transmission portions and an engagement portion, formed on an inner diameter portion of the other end thereof,

wherein the torque transmission portions on the other  
5 end portion of the stub shaft are made larger in diameter  
than the torque transmission portions on the one end  
portion.

6. A drive wheel bearing assembly having a fixed type  
10 constant velocity universal joint, coupled to a wheel  
bearing, mounted to one end portion of an intermediate  
shaft, and a sliding type constant velocity universal joint,  
coupled to a differential, mounted to the other end portion  
of said intermediate shaft, said drive wheel bearing  
15 assembly comprising a stub shaft connected to an inner  
joint ring of the fixed type constant velocity universal  
joint by means of torque transmission portions and an  
engagement portion, formed on an outer diameter portion of  
one end thereof, and connected detachably to the hollow  
20 intermediate shaft by means of torque transmission  
portions and an engagement portion, formed on an outer  
diameter portion of the other end thereof,

wherein the torque transmission portions on the other end portion of the stub shaft are made larger in diameter than the torque transmission portions on the one end

portion.

7. A drive wheel bearing assembly according to any one of claims 1, 5, and 6, wherein said torque transmission portions are formed of serrations engaged with each other.

8. A drive wheel bearing assembly according to claim 5 or 6, wherein said engagement portion is adapted to have a protruding member arranged on an outer diameter portion of the one end portion of the stub shaft and on an outer diameter portion or an inner diameter portion on the one end portion of the intermediate shaft to prevent axial movement thereof at an end portion of said torque transmission portions.

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Sub C 9. A drive wheel bearing assembly having a fixed type constant velocity universal joint, coupled to a wheel bearing, mounted to one end portion of an intermediate shaft, and a sliding type constant velocity universal joint, coupled to a differential, mounted to the other end portion of said intermediate shaft,

wherein an allowable plunging down to a bottom portion of an outer joint ring of said sliding type constant velocity universal joint is set to at least a width of an inner joint ring of said fixed type constant

velocity universal joint at a minimum operative angle of the sliding type constant velocity universal joint.

Sub 82> 10. A drive wheel bearing assembly according to any  
5 one of claims 5, 6, and 9, wherein a stem portion of the  
outer joint ring of said fixed type constant velocity  
universal joint is made hollow, and the hollow portion is  
allowed to communicate with a mouse portion of the outer  
joint ring.

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11. A drive wheel bearing assembly according to claim  
10, wherein an end cap is mounted to the communicating  
region between the hollow portion of said stem portion and  
said mouse portion, and a communicating portion is formed  
15 substantially at a center of the end cap.

12. A drive wheel bearing assembly according to any  
one of claims <sup>5, 6 or 9</sup> 1 to 11, wherein said wheel bearing is  
plastically connected to the outer joint ring of said fixed  
20 type constant velocity universal joint.

13. A drive wheel bearing assembly according to any  
one of claims <sup>5, 6, or 9</sup> 1 to 12, wherein a seal boot is mounted on  
said stub shaft or on the outer diameter portion of the  
25 other end portion of said intermediate shaft.

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Sub C. 14. A drive wheel bearing assembly according to claim 13, wherein said seal boot is formed of resin.

A 5 Sub B. 15. A drive wheel bearing assembly according to any one of claims 1, <sup>5, 6, or 9</sup> to 14, wherein one of a plurality of rows of races in said wheel bearing is formed on an outer diameter portion of a hub ring constituting the wheel bearing, and another race is formed on an outer diameter portion of a separate inner ring engaging the outer joint ring of said fixed type constant velocity universal joint.

15 Sub C. 16. A drive wheel bearing assembly according to claim 15, wherein opposite edges of the hub ring and the separate inner ring, having said another race formed on the outer diameter portion thereof and engaging the outer joint ring of the fixed type constant velocity universal joint, are brought into contact with each other, and a coupler collar is mounted to the abutting edge portions of said hub ring and the inner ring.

4 Sub B. 17. A drive wheel bearing assembly according to any one of claims 1, <sup>5, 6, or 9</sup> to 14, wherein at least one of the plurality of rows of races of said wheel bearing is formed integrally on the outer diameter portion of the outer joint



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A 21. A drive wheel bearing assembly according to claim  
19 ~~or 20~~, wherein an outer diameter surface of said hub  
ring and an inner diameter surface of said fixed type  
5 constant velocity universal joint, extended from the  
engagement surfaces between said hub ring and said inner  
ring are connected engageably by serrations to each other.

A 22. A drive wheel bearing assembly according to claim  
10 19 ~~or 20~~, wherein an outer diameter surface of said inner  
ring and an inner diameter surface of said fixed type  
constant velocity universal joint are connected engageably  
by serrations to each other.

A 23. A drive wheel bearing assembly according to ~~any~~  
15 ~~one of claims 19 to 22~~ <sup>claim 19</sup>, wherein a serration engagement  
region is formed on engagement surfaces except for the  
plastically connected region between said hub ring and said  
inner ring.

20 24. The drive wheel bearing assembly according to  
A claim 19 ~~or 20~~, wherein an inner diameter surface of said  
inner ring and an outer diameter surface of said fixed type  
constant velocity universal joint are connected engageably  
25 by serrations to each other.



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25. A drive wheel bearing assembly according to claim 18, wherein the inner diameter surface of said hub ring and an outer diameter surface outboard of a torque transmission coupling shaft are connected engageably by serrations to each other; an outer diameter surface inboard of the torque transmission coupling shaft and an inner diameter surface of an edge portion outboard of said outer joint ring are connected engageably by serrations to each other; a reduced diameter edge portion inboard of said hub ring is plastically deformed radially outwards by caulking to be fixedly pressed against said inner ring in its outboard direction; and an edge portion of the torque transmission coupling shaft inserted from an outboard direction into the inner diameter portion of said hub ring and the outer joint ring are axially coupled to each other by detachable coupling means.

26. A drive wheel bearing assembly according to claim 18, wherein the inner diameter surface of said hub ring and the outer diameter surface outboard of the torque transmission coupling shaft are connected engageably by serrations to each other; the outer diameter surface inboard of the torque transmission coupling shaft and the inner diameter surface of an edge portion outboard of said

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outer joint ring are connected engageably by serrations to each other; the outer diameter of the torque transmission coupling shaft engaging the serrations of said outer joint ring is made larger at least than said inner ring; the edge  
5 portion outboard of said torque transmission coupling shaft is plastically deformed radially outwards by caulking to be fixedly pressed against said inner ring in its outboard direction; and the edge portion of the torque transmission coupling shaft inserted from an outboard direction into the  
10 inner diameter portion of said hub ring and the outer joint ring are axially coupled to each other by detachable coupling means.

27. A drive wheel bearing assembly according to claim  
15 18, comprising a torque transmission coupling shaft for also serving as the inner ring allowed to engage said hub ring, wherein the inner diameter surface of said hub ring and the outer diameter surface outboard of the torque transmission coupling shaft are connected engageably by  
20 serrations to each other; the outer diameter surface inboard of the torque transmission coupling shaft and the inner diameter surface of an edge portion outboard of said outer joint ring are connected engageably by serrations to each other; and the edge portion outboard of said torque  
25 transmission coupling shaft is plastically deformed

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radially outwards by caulking to be fixedly pressed against  
said torque transmission coupling shaft in its outboard  
direction; and said torque transmission coupling shaft and  
the outer joint ring are thereby axially coupled to each  
5 other by detachable coupling means.

28. A drive wheel bearing assembly according to claim  
18, wherein the inner diameter surface of said hub ring and  
the outer diameter surface outboard of the torque  
10 transmission coupling shaft, also serving as the inner ring,  
are connected engageably by serrations to each other; the  
inner diameter surface inboard of the torque transmission  
coupling shaft and the outer diameter surface of an edge  
portion outboard of the outer joint ring are connected  
15 engageably by serrations to each other; the edge portion  
outboard of said torque transmission coupling shaft is  
plastically deformed radially outwards by caulking to be  
fixedly pressed against said torque transmission coupling  
shaft in its outboard direction; and said torque  
20 transmission coupling shaft and the outer joint ring are  
axially coupled to each other by detachable coupling means.

29. A drive wheel bearing assembly according to claim  
25, wherein a collar portion seated on a rim portion of a  
bore of the hub ring is provided on the edge portion

outboard of said torque transmission coupling shaft, and pins or bolts are inserted radially detachably into the edge portion outboard of said outer joint ring so as to at least axially engage said torque transmission coupling  
5 shaft.

30. A drive wheel bearing assembly according to claim 25, wherein the collar portion seated on the rim portion of the bore of the hub ring is provided on the edge portion  
10 outboard of said torque transmission coupling shaft; annular grooves are formed on serrations between the edge portion outboard of said outer joint ring and said torque transmission coupling shaft; and a keeper ring is mounted detachably into said annular grooves.

15 31. A drive wheel bearing assembly according to claim 25, wherein annular grooves are formed on serrations between said torque transmission coupling shaft, and said hub ring and outer joint ring, and a keeper ring is mounted  
20 detachably into said annular grooves.

A 32. A drive wheel bearing assembly according to claim 26 ~~or 27~~, wherein annular grooves are formed on serrations between said torque transmission coupling shaft and said  
25 outer joint ring, and a keeper ring is mounted detachably

into said annular grooves.

33. A drive wheel bearing assembly according to claim 18, wherein the edge portion inboard of said hub ring is extended to the inner diameter surface of the outer joint ring of said constant velocity universal joint; an outer diameter surface of the extended portion and the inner diameter surface of said outer joint ring are connected engageably by serrations to each other; and said hub ring and said outer joint ring are fastened axially by bolts and nuts, providing a given maximum fastening force, thereby pressing the edge surface outboard of said outer joint ring against an edge surface of the inner ring at a given pressure.

34. A drive wheel bearing assembly according to claim 33, wherein heat treatment is performed on a portion leading from seal engagement surfaces immediately near a race inboard of said hub ring to said serration-formed region, and on a serration-formed region of said outer joint ring.

35. A drive wheel bearing assembly according to claim 33 or 34, wherein said fastening bolt is press fitted into said outer joint ring.

36. A drive wheel bearing assembly according to claim  
A 33 or ~~34~~, wherein said fastening bolt is fixedly clipped to  
said outer joint ring.

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37. A drive wheel bearing assembly according to claim  
A 33 or ~~34~~, wherein said fastening bolt is fixed to said  
outer joint ring by press fitting a seal plate therein.

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